

CLAIM OR CLAIMS

WHAT IS CLAIMED IS:

1. A method of monitoring a data transmission having a plurality of physical links between two network nodes, corresponding ones of the physical links being combined to form a virtual link and data transmitted between the two network nodes being distributed to the individual physical links, with data packets containing affiliation information about the virtual link to which the corresponding ones of the physical links belong being transmitted on the physical links between the two network nodes during the data transmission, comprising the steps of:
  - a) tapping into the physical links by connecting a monitoring device to each of the physical links;
  - b) receiving the data packets transmitted between the network nodes over the tapped physical links at the monitoring device;
  - c) extracting in the monitoring device the affiliation information from the received data packets; and
  - d) analyzing the extracted affiliation information to determine the corresponding ones of the physical links that are combined to form the virtual link.
2. The method according to claim 1 further comprising the step of analyzing the extracted affiliation information in order to recognise the addition of another one of the physical links to the virtual link.

3. The method according to claims 1 or 2 further comprising the step of analyzing the extracted affiliation information in order to recognise the removal of one of the corresponding ones of the physical links from the virtual link.

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4. The method according claim 1 wherein in a bi-directional data transmission between the two network nodes the virtual link comprises a first virtual link from a first to a second of the network nodes having the same affiliation information as a second virtual link from the second to the first network node and further comprising the step of:

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connecting the physical links from the plurality of physical links on which data are transmitted from the first network node to the second network node to a first interface of the monitoring device; and

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connecting physical links from the plurality of physical links on which data are transmitted from the second network node to the first network node to a second interface of the monitoring device.

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5. The method according to claim 1 in a bi-directional data transmission between the two network nodes wherein the virtual link comprises a first virtual link from a first to a second of the network nodes having the same affiliation information as a second virtual link from the second to the first network node with the data being encoded in accordance with a transfer protocol that has several layers and with the data transmitted on a single physical link of the virtual link not being encoded according to the highest

layer, and wherein the analyzing step comprises the steps of:

d1) assigning a selection of the physical links which transfer the same affiliation information to the first virtual link;

d2) recognizing an information channel transmitted on the first virtual link and recognizing the information structure present there;

d3) forming the information resulting as a consequence in a higher layer;

d4) analyzing the information of the higher protocol layer in order to examine whether the selection of physical links actually form the first virtual link;

d5) if the result of this examination in step d4) is positive, assigning the selection of physical links of step d1) as the first virtual link;

d6) if the result of the examination in step d4) is negative, repeating steps d1) to d4) with different selections of physical links until the result of step d4) is that the physical links forming the first virtual link have been determined.

6. The method according to claim 5 further comprising the step of assigning the physical links which transmit the same affiliation information as the determined virtual link to the second virtual link which exists between the same network nodes but transmits in the opposite direction to the first virtual link.

7. The method according to claims 1, 2, 4, 5 or 6 further comprising the step of combining sequence information in the data packets which provides information on how the data transmitted on the individual physical links of the

virtual link are assembled to form a continuous data stream; and wherein the analyzing steps comprise the steps of:

- analyzing the sequence information within the monitor device;
- compiling the data transmitted on the individual physical links into the
- 5 continuous data stream, taking account of different propagation delays; and
- making the continuous data stream available at an output.

8. The method according to claim 7 wherein the data packets are ATM cells, the plurality of physical links are combined according to the IMA  
10 specification to form the virtual link, the affiliation information is a suitable selection of information transmitted in ICP cells that are classified as B and C in the IMA specification, and the sequence information is information transmitted in the ICP cells that is classified as A in the IMA specification.

15 9. The method according to claim 8 wherein the transfer protocol is the AAL5 protocol and wherein in the analyzing step length information for transmitted AAL5 PDUs and /or a CRC32 check sum are analyzed.

10. The method according to claim 8 wherein the transfer protocol is the  
20 AAL2 protocol and wherein in the analyzing step the length of a payload of a CPS packet, which extends over more than one ATM cell is compared with an offset field of a subsequent cell and/or a sequence number is analyzed by transmitted AAL2 cells.

11. The method according to claim 1 wherein the data packets are ATM cells, the plurality of physical links are combined according to the IMA specification to form the virtual link, the affiliation information is a suitable selection of information transmitted in ICP cells that are classified as B and C in the IMA specification, and sequence information is information transmitted in the ICP cells that is classified as A in the IMA specification.

12. The method according to claim 5 wherein the transfer protocol is the AAL5 protocol and wherein in the analyzing step length information for transmitted AAL5 PDUs and /or a CRC32 check sum are analyzed.

13. The method according to claim 5 wherein the transfer protocol is the AAL2 protocol and wherein in the analyzing step the length of a payload of a CPS packet, which extends over more than one ATM cell is compared with an offset field of a subsequent cell and/or a sequence number is analyzed by transmitted AAL2 cells.

14. A device for monitoring a data transmission over a plurality of physical links between two network nodes, corresponding ones of the physical links being combined to form a virtual link, with data transmitted between the two network nodes being distributed to individual physical links and with data packets containing affiliation information about the virtual link to which the corresponding ones of the physical links belongs being transmitted over the physical links between the two network nodes during the data transmission

comprising:

a plurality of connections for tapping into the physical links;

means for receiving the data packets transmitted on the plurality of physical links via the plurality of connections;

5 means for extracting the affiliation information from the data packets;

and

means for analyzing the extracted affiliation information to determine the corresponding ones of the physical links which are combined to form the virtual link.